

What is claimed is:

1. A method for use with the formation of a capacitor, the method comprising:
providing a capacitor structure including:
5 forming a first electrode on a portion of a substrate assembly,
 forming a high dielectric material over at least a portion of the first
 electrode, and
 forming a second electrode over the high dielectric material; and
 forming a layer over at least a portion of the second electrode, wherein at
10 least one of the portion of the substrate assembly and the layer formed over the
 second electrode is formed of an excess oxygen containing material.
2. The method of claim 1, wherein both the portion of the substrate assembly
15 and the layer formed over the second electrode is formed of an excess oxygen
 containing material.
3. The method of claim 1, wherein the excess oxygen containing material is an
 ozone enhanced material deposited using an ozone enhanced chemical reaction.
- 20 4. The method of claim 3, wherein the ozone enhanced material is a doped
 ozone enhanced oxide material.
5. The method of claim 3, wherein the ozone enhanced material is an ozone
25 enhanced tetraethylorthosilicate material.
6. The method of claim 5, wherein the ozone enhanced tetraethylorthosilicate
 material is a doped ozone enhanced tetraethylorthosilicate material.

7. The method of claim 6, wherein the doped ozone enhanced tetraethylorthosilicate material is doped with boron and phosphorous in a concentration ranging from 0 percent to about 5 percent boron and 0 percent to about 8 percent phosphorous.

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8. The method of claim 5, wherein the ozone enhanced tetraethylorthosilicate material includes an oxygen concentration of about 66.67 percent to about 76.6 percent.

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9. The method of claim 1, wherein the method includes forming one or more post capacitor formation layers during one or more thermal cycles relative to the capacitor structure, and further wherein an oxygen concentration of the high dielectric material is substantially maintained during formation of the one or more post capacitor formation layers.

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10. The method of claim 9, wherein the one or more thermal cycles include alloying in an atmosphere of hydrogen.

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11. A method for use with the formation of a capacitor, the method comprising:
providing a first electrode;

providing a high dielectric material over at least a portion of the first electrode;

providing a second electrode over the high dielectric material; and

forming an ozone enhanced oxide layer over at least a portion of the second

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electrode.

12. The method of claim 11, wherein the step of forming the ozone enhanced oxide layer includes forming an ozone enhanced doped oxide layer over the second electrode.
- 5 13. The method of claim 12, wherein the ozone enhanced doped oxide layer is a layer of ozone enhanced BPSG.
- 10 14. The method of claim 11, wherein the step of forming the ozone enhanced oxide layer includes forming an ozone enhanced tetraethylorthosilicate layer over the second electrode.
- 15 15. The method of claim 14, wherein the ozone enhanced tetraethylorthosilicate layer is a doped ozone enhanced tetraethylorthosilicate layer.
- 16 16. The method of claim 15, wherein the doped ozone enhanced tetraethylorthosilicate layer is doped with boron and phosphorous in a concentration ranging from 0 percent to about 5 percent boron and 0 percent to about 8 percent phosphorous.
- 20 17. The method of claim 14, wherein the ozone enhanced tetraethylorthosilicate layer includes an oxygen concentration of about 66.67 percent to about 76.6 percent.
- 25 18. The method of claim 11, wherein at least a portion of the first electrode is provided on a ozone enhanced oxide layer.
19. The method of claim 14, wherein the method includes forming one or more post capacitor formation layers during one or more thermal cycles relative to the ozone enhanced oxide layer, and further wherein an oxygen concentration of the

high dielectric material is substantially maintained during formation of the one or more post capacitor formation layers.

- 5 20. A method for use with the formation of a capacitor, the method comprising:
 providing a substrate assembly having a region formed of an ozone enhanced
oxide material;
 forming a first electrode over at least a portion of the region of ozone
enhanced oxide material;
 forming a high dielectric material over at least a portion of the first electrode;
10 and
 forming a second electrode over the high dielectric material.
- 15 21. The method of claim 20, further including a step of forming a layer of ozone
enhanced oxide material over at least a portion of the second electrode.
22. The method of claim 20, wherein the ozone enhanced oxide material
includes an ozone enhanced doped oxide material.
- 20 23. The method of claim 20, wherein the ozone enhanced oxide layer includes an
ozone enhanced tetraethylorthosilicate material.
24. The method of claim 23, wherein the ozone enhanced tetraethylorthosilicate
material is a doped ozone enhanced tetraethylorthosilicate material.
- 25 25. The method of claim 24, wherein the doped ozone enhanced
tetraethylorthosilicate material is doped with boron and phosphorous in a
concentration ranging from 0 percent to about 5 percent boron and 0 percent to
about 8 percent phosphorous.

26. The method of claim 20, wherein the method includes forming one or more post capacitor formation layers during one or more thermal cycles, and further wherein an oxygen concentration of the high dielectric material is substantially maintained during formation of the one or more post capacitor formation layers.

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27. A method for use in forming a memory cell having a capacitor, the method comprising the steps of:

providing a capacitor having a first electrode, a second electrode, and a high dielectric material between the first and second electrode, wherein the capacitor is sandwiched between two regions, at least a portion of at least one of the two regions is formed of an ozone enhanced oxide material; and

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forming one or more post capacitor formation layers during one or more thermal cycles relative to the capacitor, wherein an oxygen concentration of the high dielectric material is substantially maintained during formation of the one or more post capacitor formation layers.

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28. The method of claim 27, wherein the ozone enhanced oxide material includes an ozone enhanced tetraethylorthosilicate material.

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29. The method of claim 28, wherein the ozone enhanced tetraethylorthosilicate material is a doped ozone enhanced tetraethylorthosilicate material.

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30. The method of claim 29, wherein the doped ozone enhanced tetraethylorthosilicate material is doped with boron and phosphorous in a concentration ranging from 0 percent to about 5 percent boron and 0 percent to about 8 percent phosphorous.

31. A capacitor structure, comprising:

a first electrode formed on at least a portion of a substrate assembly;
a dielectric material on at least a portion of the first electrode;
a second electrode on the dielectric material; and
a layer formed over at least a portion of the second electrode, wherein at
5 least one of the portion of the substrate assembly and the layer formed over the
second electrode is formed of an excess oxygen containing material.

32. The structure of claim 31, wherein both the portion of the substrate assembly
and the layer formed over the second electrode is formed of an excess oxygen
10 containing material.

33. The structure of claim 31, wherein the excess oxygen containing material
includes an ozone enhanced oxide material.

15 34. The structure of claim 33, wherein the ozone enhanced oxide material is a
doped ozone enhanced oxide material.

35. The structure of claim 33, wherein the ozone enhanced oxide material is an
ozone enhanced tetraethylorthosilicate material.

20 36. The structure of claim 35, wherein the ozone enhanced tetraethylorthosilicate
material is a doped ozone enhanced tetraethylorthosilicate material.

25 37. The structure of claim 36, wherein the doped ozone enhanced
tetraethylorthosilicate material is doped with boron and phosphorous in a
concentration ranging from 0 percent to about 5 percent boron and 0 percent to
about 8 percent phosphorous.

38. The structure of claim 35, wherein the ozone enhanced tetraethylorthosilicate material includes an oxygen concentration of about 66.67 percent to about 76.6 percent.

39. A method for use in forming an integrated circuit structure, the method comprising:

forming a capacitor structure, wherein the capacitor structure comprises a first conductive material, a second conductive material, and a dielectric material between at least portions of the first and second conductive material, wherein the dielectric material comprises an initial oxygen concentration upon formation thereof;

forming an excess oxygen containing material on at least a portion of the second conductive material, wherein forming the excess oxygen containing material comprises reacting TEOS with ozone; and

subjecting the capacitor structure and the excess oxygen containing material to thermal cycling during one or more fabrication processes, wherein the excess oxygen containing material provides oxygen atoms during the thermal cycling to the dielectric material such that oxygen reduction in the dielectric material due to the thermal cycling is reduced.

40. The method of claim 39, wherein the initial oxygen concentration of the dielectric material is substantially maintained during the thermal cycling.

41. The method of claim 39, wherein the one or more fabrication processes comprise formation of one or more post capacitor formation layers.

42. The method of claim 41, wherein the one or more post capacitor formation layers comprise at least one of a layer of another capacitor structure, a layer of an interconnect structure, an insulating layer, and a wafer coating.

43. The method of claim 39, wherein the one or more fabrication processes comprise a thermal annealing process.

44. The method of claim 39, wherein the one or more fabrication processes comprise an alloying process in an atmosphere comprising hydrogen.

5 45. The method of claim 39, wherein the excess oxygen containing material comprises an ozone enhanced tetraethylorthosilicate material.

46. The method of claim 39, wherein the excess oxygen containing material comprises a doped ozone enhanced tetraethylorthosilicate material.

10 47. The method of claim 46, wherein the doped ozone enhanced tetraethylorthosilicate material is doped with boron and phosphorous in a concentration ranging from 0 percent to about 5 percent boron and 0 percent to about 8 percent phosphorous.

15 48. The method of claim 39, wherein the capacitor is formed as a part of a memory device.

20 49. The method of claim 39, wherein an oxygen concentration of the excess oxygen containing material is about 0.01 percent to about 10 percent greater than a material formed using TEOS without reaction with ozone.

50. The method of claim 39, wherein the dielectric material is a dielectric material having a dielectric constant of about 10 or greater.

25 51. A method for use in forming an integrated circuit structure, the method comprising:

forming a capacitor structure, wherein the capacitor structure comprises a first conductive material, a second conductive material, and a dielectric material between at least portions of the first and second conductive material, wherein the

dielectric material comprises an initial oxygen concentration upon formation thereof;

forming an ozone enhanced oxide material on at least a portion of the second conductive material; and

5 subjecting the capacitor structure and the ozone enhanced oxide material to thermal cycling during one or more fabrication processes, wherein the ozone enhanced oxide material provides oxygen atoms during the thermal cycling to the dielectric material such that the initial oxygen concentration of the dielectric material is substantially maintained during the thermal cycling.

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52. The method of claim 51, wherein the one or more fabrication processes comprise formation of one or more post capacitor formation layers.

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53. The method of claim 51, wherein the one or more fabrication processes comprise a thermal annealing process.

54. The method of claim 51, wherein the one or more fabrication processes comprise an alloying process in an atmosphere comprising hydrogen.

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55. The method of claim 51, wherein the ozone enhanced oxide material comprises a doped ozone enhanced oxide material.

56. The method of claim 51, wherein the ozone enhanced oxide material comprises an ozone enhanced tetraethylorthosilicate material.

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57. The method of claim 56, wherein the ozone enhanced oxide material comprises a doped ozone enhanced tetraethylorthosilicate material.

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58. The method of claim 57, wherein the doped ozone enhanced tetraethylorthosilicate material is doped with boron and phosphorous in a

concentration ranging from 0 percent to about 5 percent boron and 0 percent to about 8 percent phosphorous.

5 59. The method of claim 51, wherein the dielectric material is a dielectric material having a dielectric constant of about 10 or greater.

60. The method of claim 51, wherein the capacitor is formed as a part of a memory device.